Cement MILL SECTION of

Concrete

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A Photometric Method for Magnesia in Portland Cement

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The following article describes a method for the determination of magnesia in portland cement which has been in use for some months in the laboratory of a cement manufacturing company in the West, and has been thoroughly tested out by comparative analyses. It is pointed out by the author that it offers considerable saving of time with sufficient accuracy for routine mill analyses and is also applicable to magnesia determinations in limestone, slag, etc., and should be of considerable interest to mill chemists.—Editor.

In the routine analysis of cement, the magnesia is usually precipitated in the afternoon and allowed to stand over night. It occurred to the writer that a photometric method might be devised using Jackson's photometer (which is used in nearly all cement laboratories for sulfuric anhydride determinations) whereby the analysis could be completed the same day, and the magnesia determined with reasonable accuracy. Experiments were conducted to test the feasibility of the scheme.

The only apparatus used was Jackson's photometer. The tube was 27 millimeters internal diameter, graduated in millimeters to the 25 centimeter mark. The top edge of the candle holder was four inches below the bottom of the glass tube, instead of three inches as is usual in this apparatus.

Experimental Part

Different methods of precipitating the magnesia were tried such as shaking in a flask with excess of the reagent and stirring for different lengths of time with a stirring rod. The method finally adopted was as follows:

A solution of pure magnesium chloride and water, containing 0.0022 grams magnesium oxide per cubic centimeter was made up, and different amounts of the solution measured into a 250-c.c. volumetric flask. Ten cubic centimeters of hydrochloric acid was added and the solution just neutralized with amonium hydroxide using methyl orange as indicator. Ten cubic centimeters of saturated solution of ammonium oxalate was then added, the solution cooled to 15° C. and diluted to the mark.

The solution was transferred to a 600-c.c. beaker, 40 c.c. of cold saturated solution of sodium ammonium hydrogen phosphate added, and the volumetric flask rinsed out with 25 c.c. concentrated ammonium hydroxide and added to the contents of the beaker.

The solution was then stirred vigorously for two minutes with a stirring rod to which a broom shaped policeman three centimeters wide was fastened. The stirring was done across the diameter of the beaker, avoiding a circular motion of the rod, and the rubber policeman rubbed energetically along the bottom of the beaker.

A fine granular precipitate is produced and the solution without being allowed to settle is poured into the photometer tube until the image of the candle flame is just obscured. The readings corresponding to the weight of magnesium oxide were taken and a graph plotted, as shown in Fig. 1.

The abscissas express the weight of the magnesium oxide in milligrams and the ordinates the reading of the tube. From this graph a table of values was prepared.

The Determination

The analysis of the cement is conducted in the usual manner, including the precipitation of the lime. The filtrate from the lime is made slightly acid and evaporated to about 200 c.c. and is then neutralized with ammonium hydroxide, using methyl orange as indicator, cooled to 15° C. and diluted to 250 c.c.

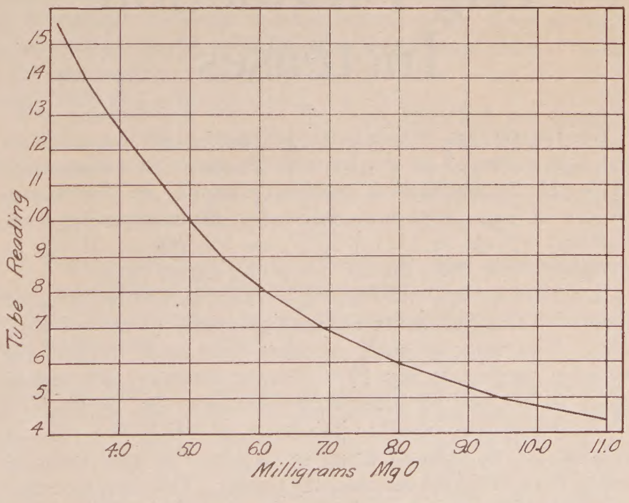

Fig. 1—Graph showing relation between readings of photometer tube and weight of magnesium oxide

This solution is transferred to the 600-c.c. beaker in which the evaporation was made, treated with 40 c.c. of saturated solution of sodium ammonium hydrogen phosphate, the volumetric flask rinsed out with 25 c.c. concentrated ammonium hydroxide and added to the solution in the beaker.

The stirring is conducted with the stirring rod and rubber policeman as before noted, and the photometer reading taken.

The small amount in the photometer tube is transferred back into the beaker and the stirring repeated for two minutes more and a reading again taken. This last reading should be taken as final.

By consulting the graph the weight of magnesium oxide is readily found and the percentage calculated.

Comparative results on a number of cements are shown in the following table:

Cement	Photometric	Gavrimetric
No. 1	1.14%	1.12%
No. 2	1.44%	1.45%
No. 2	1.44%	1.45%
No. 3	1.48%	1.46%
No. 4	1.66%	1.59%
No. 5	1.36%	1.43%
No. 6	2.00%	1.95%

The flatness of the graphic curve for values below 3 milligrams and above 11.0 milligrams render it advisable to use an aliquot part of one-half in cements whose magnesia content is above 2.2%.

By this means values between 0.6% and 4.5% are determined with a good degree of accuracy.

TABLE OF VALUES

Tube Reading Millimeters	Milligrams MGO	Tube Reading Millimeters	Milligrams MGO
4.2	11.00	10.0	5.00
4.4	10.55	10.2	4.95
4.6	10.20	10.4	4.85
4.8	9.80	10.6	4.75
5.0	9.40	10.8	4.70
5.2	9.10	11.0	4.60
5.4	8.80	11.2	4.55
5.6	8.55	11.4	4.45
5.8	8.25	11.6	4.35
6.0	7.95	11.8	4.30
6.2	7.85	12.0	4.20
6.4	7.55	12.2	4.15
6.6	7.35	12.4	4.05
6.8	7.15	12.6	3.95
7.0	6.90	12.8	3.90
7.2	6.75	13.0	3.85
7.4	6.60	13.2	3.75
7.6	6.45	13.4	3.70
7.8	6.25	13.6	3.65
8.0	6.10	13.8	3.55
8.2	6.00	14.0	3.50
8.4	5.85	14.2	3.45
8.6	5.75	14.4	3.40
8.8	5.60	14.6	3.35
9.0	5.45	14.8	3.30
9.2	5.35	15.0	3.25
9.4	5.25	15.2	3.20
9.6	5.15	15.4	3.15
9.8	5.10	15.6	3.10

Bag Production Increases

The Department of Commerce announces that, according to the data collected at the biennial census of manufacturers, 1923, the establishments engaged primarily in the manufacture of bags from materials other than paper reported products valued at $151,675,727, an increase of 31.4% as compared with 1921, the last preceding census year.

In addition, bags and bagging were manufactured to some extent by establishments engaged primarily in other industries. The value of such products thus made outside the industry proper during 1921 was as follows: By cotton mills, $6,760,998; by jute goods manufacturers, $4,106,937; by establishments in other industries, $1,192,103; a total of $12,060,038, an amount equal to 10% of the total value of products reported for the industry proper. The corresponding value for 1923 has not yet been ascertained but will be shown in the final report of the present census.

Of the 169 establishments reporting for 1923, 42 were located in New York, 13 in Pennsylvania, 10 each in Illinois and Missouri, 9 in Ohio, 8 each in New Jersey and Virginia, 7 in Massachusetts, 6 each in California, Georgia, and Louisiana, 5 each in Maryland, Tennessee, and Texas, and the remaining 29 in 14 other States.

The statistics for 1923 and 1921 are summarized in the following statement. The figures for 1923 are preliminary and subject to such correction as may be found necessary upon further examination of the returns.

	1923	1921	Per Cent of Increase
Number of establishments	169	169	....
Wage earners (average number) (*a*)	11,604	10,324	12.4
Maximum month	Oct. 12,096	Oct. 12,039	....
Minimum month	Dec. 11,178	Jan. 9,115	....
Percent of maximum	92.4	75.7	....
Wages	$9,360,999	$8,031,523	16.6
Cost of materials (including fuel and containers)	$128,221,603	$99,437,815	28.9
Products, total value	$151,675,727	$115,452,413	31.4
Value added by manufacture (*b*)	$23,454,124	$16,014,598	46.5
Horsepower	13,869	(*c*)	....
Coal consumed (tons of 2,000 lbs.)	43,984	(*c*)	....

(*a*) Not including salaried employees nor proprietors and firm members. Statistics for these classes will be given in final report.

(*b*) Value of products less cost of materials.

(*c*) Not reported.

Springing Bore Holes

Recommendations for increasing the efficiency and safety of springing a bore hole, or shaking, as it is sometimes called, are given by Charles S. Hurter, technical representative of the E. I. du Pont de Nemours & Co., in the *DuPont Explosives Service Bulletin* for June, 1924. The operation referred to is the well-known practice of exploding successive small charges of dynamite in the bottom of a bore hole in order to form a chamber large enough to permit the concentration of a heavy charge at the bottom of the hole. Each springing operation is an individual problem conditioned by the nature of the material, the results desired from the blast in preparation and other local factors. Consequently the information in the Bulletin must be applied by explosives users according to the particular conditions existing in their operations.

In general, starting with a small charge and gradually increasing its size makes the chamber at the bottom of the hole, where it is desired, and gives the sprung hole the spherical shape which affords the best confinement to the explosive. Too large a charge for the first shot tends to give the hole the shape of a pear with the stem upward or even that of a cylinder. A fairly good rule is not to allow the first charge to occupy more than one-twentieth of the total depth of the bore hole. The amount of the first charge and of the succeeding springing charges should, of course, depend a good deal on the nature of the ground, care being necessary not to use so much explosive that the hole will cave and be lost.

In summing up, the most important rules in regard to springing holes are given as follows:

Do not place any explosive in a sprung hole as long as a pole left in it feels warm to the hand.

Keep the first springing charge down to within one-twentieth of the depth of the bore hole.

Use special care in loading the charge to exclude all air spaces.

Use tamping material free from small rock particles and make the quantity small enough so that the springing charge will throw it clear of the bore hole. Water tamping has advantages when conditions permit its use.

Do not use any combustible material for tamping.

Fire all springing shots electrically.

Fire springing shots, where there are several holes, one at a time.

And, most important of all, do not use high-strength, straight dynamite in sprung holes either for springing shots or for the final charge. Gelatin is the safest and most efficient explosive in everything but hardpan, clay and soft earth, where an ammonia dynamite is preferable.

The Kiln Room

Some Financial Considerations

By C. H. Sonntag

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This is part 2 of Mr. Sonntag's article which discusses some financial considerations of the kiln room in the cement plant. Part 1 appeared in the June, 1925, issue of the CEMENT MILL SECTION of CONCRETE.

KILN FORCING WITH WASTE HEAT BOILERS

The installation of these boilers introduces another item into our calculation of the value of forcing the kilns. When the heat leaving the kiln was to be used to make steam it suddenly appeared that the opening where the kiln enters the stack was the source of much loss due to infiltration of cold air, and the seal rings mentioned above were the result.

As a matter of fact the loss on this score is not as great as is commonly supposed. If 30% of the air or gas passing through the boiler comes through this opening it may be calculated that the gain in available heat by closing the opening is only about 5%, if conditions in the kiln remain unaltered. The reason is that while the gases going to the boiler are hotter, not being cooled and diluted by this outside air, they are also less in volume by the same 30%. The 5% loss due to the opening is then the heat required to warm this leakage air from the temperature of the kiln room to that at which it leaves the waste heat system[4].

In reality conditions in the kiln do not remain unchanged when the seal ring is applied. If the waste heat fan was able to handle the 30% leakage air, it will be able to do the same amount of work in handling gas from another source, and this source is the kiln itself. Closing the opening increases the draft at that point, drawing more air through the kiln and permitting more coal to be burned, and hence more clinker to be made. This is the explanation of the increased kiln production that many plants using waste heat boilers have noted.

Burning more coal in the kiln will make more steam in the boiler, and it should be possible for any operator to so adjust the rate of clinker production to that of steam making that he can get all the power needed for the entire plant, provided his engines or turbines are reasonably efficient. It would be cheaper to get the power in this way, even at a slight sacrifice in kiln fuel per barrel, for the auxiliary boiler, if used, would be working most of the time at part load, and hence inefficiently, and would require operating labor and repairs.

It has been claimed that mills using waste heat must grind up their clinker as fast as they make it, and can not use an extensive clinker storage. While this might apply to the plant having a high power consumption per barrel, it should not necessarily be true of the average mill. The clinker storage is of definite value in two ways:

First, many of us still believe that clinker is much easier ground after seasoning than when fresh from the kilns.

Second, the storage acts as an equalizer between the kilns and finishing mill. The plant that must grind its clinker as it makes it must also have bin capacity to hold its winter production or must shut down. Bin storage costs money, and the carrying charges make quite an item in the overhead. Clinker may be stored in the open with no bin expense, and a nominal handling charge for a crane that would probably be available anyway. The clinker will grind enough easier so that the mills can gradually use up the storage, and the provision of an extra pulverizer would make this certain. Firing of the kilns could be so regulated as to give whatever extra power might be necessary.

FORCING KILNS VS. MORE KILNS

There are in the United States and Canada about 49 separate mills having three kilns or less, and 94 having four kilns or more. The only way those in the first group can increase production with the present kiln equipment is to force them, but those in the second class have a certain amount of choice as to whether they will operate a certain number of kilns by forcing, or whether they will install another and run to get the same gross production with a lower coal consumption per barrel.

Here there is no question of lost profit on cement that is not made, nor of increased overhead due to purposely restricted production. We will be concerned only with carrying charges on the investment in the extra kiln. If this kiln is already available the overhead on it need not be taken into account, as it will already be included in the general mill overhead.

In order to get an illustrative example, let us say that the kiln costs ready to operate $35,000, on which the carrying charge will be

$35,000 x .20	$ 7,000.00
Power to run the kiln, its blower coal feeder, etc. will be about 35 kw., which for a year will cost	
35 x 24 x 315 x $.015	3,969.00
We may also arbitrarily assess lining and other repairs at	1,000.00
Additional operating labor may cost as much as 50c per hour.	
24 x 315 x $.50	3,780.00
Making the cost of the kiln, less fuel, annually	$15,749.00

We may make 3000 bbls. daily in three kilns with 130 lbs. of coal, or the same 3000 bbls. in four kilns with 105 lbs. of coal per bbl.

The saving in coal per year by using four kilns will be

3000 x 25 x $.00275 x 315 .... $64,968.75

On the basis of the outputs and fuel consumptions assumed, the use of four kilns instead of three will more than pay the original cost of the additional kiln and its carrying charges during the first year, and will continue to yield handsome returns thereafter.

No waste heat boiler equipment has been included for the fourth kiln. If there is no common flue a boiler for this kiln should be provided, but all the boilers can be smaller than if the kilns were worked at the 1000-bbl. rate. On the other hand, if there is a common flue the fourth kiln can be connected to it without installing another boiler, as the three already in use will be ample, for less coal will be burned than if three kilns were used.

The argument in favor of the extra kiln does not depend on the use of waste heat recovery. It is just as valid for kilns running on natural draft. If this draft is too great for operation at the reduced rate it can be cut down by building a wall in the stack base close to the end of the kiln.

It should again be emphasized that the figures used above have been chosen for illustrative purposes only, and in the study of any particular mill data derived from experience at that mill should be availed of.

The average mill engineer is apt to become so concerned with getting the maximum production from his machinery that he may forget that production without profit is of no value, and it is an instructive thing to sit down and work out such problems as have been presented here. The result should be interesting to the man who has to handle the financial end of the company.

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[4] This was first brought to the writer's attention by Mr. Helmuth Krarup in conversation.

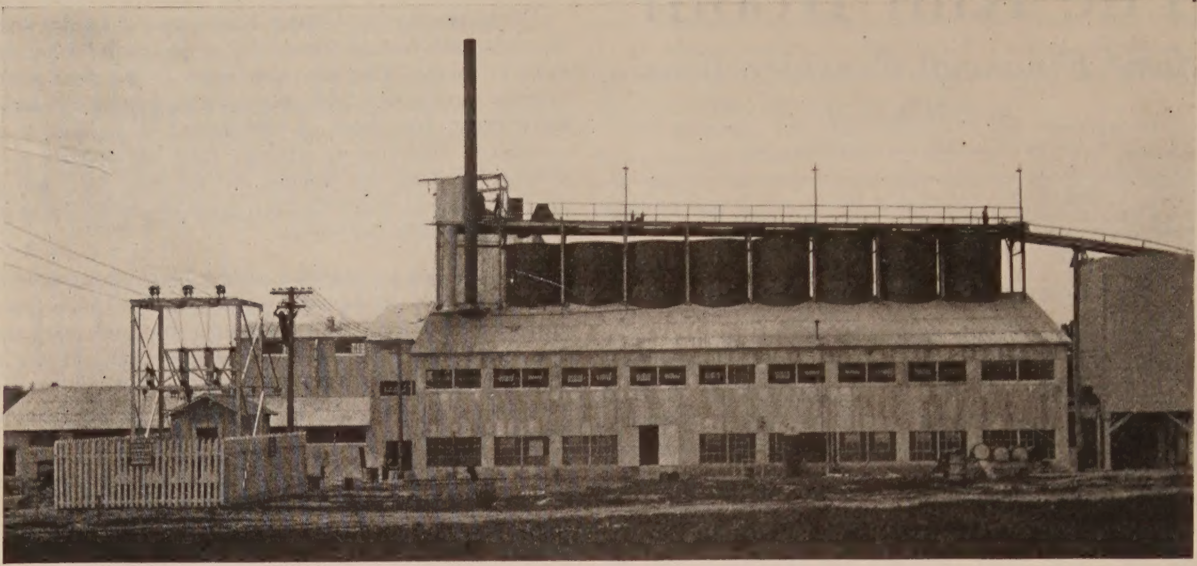

Fig. 1—New lime plant of the United States Gypsum Company at Cordova, Illinois, showing the eight kilns in the foreground with the hydrator-house and warehouse in the rear and at the left

New Lime Plant in Illinois

U. S. Gypsum Co. Puts Cordova Plant in Full Operation

The United States Gypsum Co. on June 5 put into full operation a new lime plant located one mile south of Cordova, Ill. It consists of eight steel-jacketed kilns of 12-ft. shaft with a daily capacity of 12 tons each, two Clyde (batch-type) hydrators of 60 tons daily capacity each, with kiln-house, hydrator-building and warehouse of permanent ferro-concrete construction.

Power is being supplied by the Tri-City Power Co. which has installed a 13,200-volt transmission line from East Moline to Cordova. Water is being pumped from the Mississippi river, a short distance from the plant. Transportation is provided by the Chicago, Milwaukee & St. Paul R. R. The most modern pumping and quarrying equipment, selected in accordance with the company's experience in other lime fields, has been installed.

Property was purchased in 1923 after it was found that a large supply of high-quality dolomitic limestone adaptable to the manufacture of mason's hydrate was available. A light over-burden has been stripped and preparations have been made to open a quarry to a depth of 35 ft. for the first level. Construction was begun last fall and has been carried on by a crew of 200 men. The operation will give employment to 40 men.

Its output will be about 125 tons a day of mason's hydrate. It will be distributed in the central and northwestern states, where the acceptance of hydrate instead of lump lime is well established in the building trades. A large part of the output of this plant will be shipped to the United States Gypsum Company's plant at Ft. Dodge, Iowa, to supplement the company's mixed car service to building supply dealers. Opening of these kilns will mean lower freight-rates on mason's hydrate for dealers in the western states who previously have been served from the Ohio lime field.

This is the third lime plant owned by the United States Gypsum Co., one of 40 kilns being located at Genoa, Ohio, and one of five kilns at Oakfield, N. Y. It is the first factory operated by this concern in Illinois.

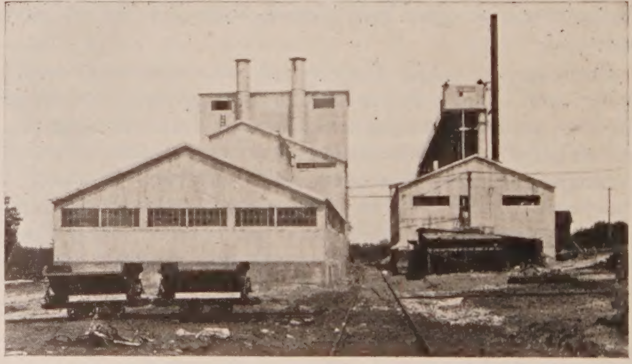

Fig. 2—New lime plant as seen from the south. Warehouse and hydrator-house are at the left of the tracks and the kiln-building is at the right

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The Marble Head Lime Co.'s plant is now working 37 men and turning out 500 bbls. of lime per day. The manager, J. M. Stohlberg, has installed an oil burner in one of the kilns and thinks it will be a success and if it is he will put them in the other three kilns. The kiln with the oil burner turns out about 100 bbls. of lime per day. One of the features about the Marble Head plant is "Uncle" Jim Ledbetter, a negro employee who has been with the company 43 years. He threw up the first spadeful of earth when the foundations were built and has been a faithful employee ever since. In dull seasons other men may be laid off but Uncle Jim sticks to the job.

Magnesite in 1924

The Department of the Interior announces through the Geological Survey that statistics compiled by J. M. Hill show that the magnesite material marketed in the United States in 1924 from domestic mines was equivalent to 100,413 short tons of crude magnesite, valued at $789,728, a decrease of 32% in quantity and 28% in value as compared with the quantity marketed in 1923. The State of Washington produced in 1924, 52,876 tons, which was more than half the total output for the year. A low value on the crude uncalcined rock is reported by Washington operators. The value of California crude magnesite produced in 1924, which amounted to 47,537 tons, is estimated at $13.67 a ton, but as all the product is sold calcined or dead-burned, the value thus fixed is entirely arbitrary.

There were fewer producers of magnesite in California in 1924 than in 1923, and the industry throughout the State was rather dormant during the summer but revived toward the end of the year. The industry in Washington was also working on a smaller scale because of the imports of magnesite. Until freight rates or import tariffs, or both, are further adjusted, domestic producers will probably not be warranted in greatly increasing their output.

MAGNESITE (EXPRESSED AS CRUDE) SUPPLY IN THE UNITED STATES. 1919-24, IN SHORT TONS

	Domestic Production	Imports	Total	Proportion of Consumption Supplied by	
				Domestic	Foreign
1919	156,226	25,321	181,547	86	14
1920	303,767	63,110	366,877	83	17
1921	47,904	65,569	113,473	42	58
1922	55,790	217,861	273,651	26	74
1923	147,250	151,092	298,342	49	51
1924	100,413	129,576	229,989	44	56

May Cement Production Breaks Record

Portland cement production in the United States for May, 1925, was the greatest on record, according to statistics compiled by the United States Geological Survey under the direction of Ernest F. Burchard. Shipments were the highest yet recorded for any May, and have been exceeded only in three other months. Stocks at the end of the month were 13% higher than in May, 1924. The May, 1925, totals include estimates for three plants.

PRODUCTION, SHIPMENTS, AND STOCKS OF FINISHED PORTLAND CEMENT, BY DISTRICTS, IN MAY, 1924 AND 1925, AND STOCKS IN APRIL, 1925, IN THOUSANDS OF BARRELS

Commercial District	Production May		Shipments May		Stocks at end of May		Stocks at end of April,
	1924	1925	1924	1925	1924	1925	1925(*a*)
Eastern Pa., N. J. & Md.	3,463	3,660	3,690	4,125	4,165	4,106	4,571
New York	685	838	747	907	1,238	1,164	1,232
Ohio, Western Pa. & W. Va.	1,201	1,540	1,837	1,590	1,883	1,966	2,017
Mich.	877	1,120	1,010	1,201	765	1,246	1,326
Wis. (*b*), Ill., Ind. & Ky.	1,960	2,400	2,133	2,586	2,524	3,369	3,555
Va., Tenn., Ala. & Ga.	985	1,162	996	1,233	771	611	683
Eastern Mo., Ia., Minn. & S. Dak. (*c*)	1,481	1,552	1,509	1,714	2,491	3,138	3,300
Western Mo., Neb., Kans. & Okla.	1,053	1,130	1,081	1,169	1,096	1,558	1,596
Texas	412	392	440	429	308	258	294
Colo. & Utah	267	265	279	227	183	350	312
Calif.	1,069	1,067	1,106	1,130	382	456	520
Ore., Wash. & Mont.	324	377	323	424	597	424	471
	13,777	15,503	14,551	16,735	16,403	18,646	19,877

(*a*) Revised. (*b*)Began producing and shipping June, 1924. (*c*) Began producing December, 1924, and shipping January, 1925.

Stocks of clinker, or unground cement, at the mills at the end of May 1925, amounted to about 8,892,000 barrels compared with 9,731 000 barrels (revised) at the beginning of the month.

PRODUCTION, SHIPMENTS, AND STOCKS OF FINISHED PORTLAND CEMENT, BY MONTHS, IN 1924 AND 1925, IN THOUSANDS OF BARRELS

Month	Production		Shipments		Stocks at end of month	
	1924	1925	1924	1925	1924	1925
January	8,788	8,856	5,210	5,162	14,155	17,656
February	8,588	8,255	5,933	6,015	16,815	19,689
March	10,370	11,034	8,995	10,279	18,189	20,469
1st Quarter	27,746	28,145	20,138	21,456	....	....
April	11,726	13,807	12,771	14,394	17,159	(*a*)19,877
May	13,777	15,503	14,551	16,735	16,403	18,646
June	13,538	....	15,036	....	14,903	....
2nd Quarter	39,041	....	42,358	....	....	....
July	14,029	....	16,614	....	12,319	....
August	15,128	....	16,855	....	10,666	....
September	14,519	....	16,827	....	8,404	....
3rd Quarter	43,676	....	50,296	....	....	....
October	14,820	....	17,160	....	6,073	....
November	13,141	....	10,289	....	8,928	....
December	10,435	....	5,506	....	13,913	....
4th Quarter	38,396	....	32,955	....	....	....
	148,859	....	145,747	....	....	....

(*a*) Revised.

IMPORTS AND EXPORTS (*a*)

IMPORTS OF HYDRAULIC CEMENT BY COUNTIRES, AND BY DISTRICTS, IN APRIL, 1925

Imported from	District into which imported	Barrels	Value
Belgium	Massachusetts	8,275	$11,971
	Philadelphia	36,692	47,345
	Florida	65,174	90,835
	Los Angeles	36,662	48,196
	San Francisco	8,364	12,762
	Oregon	1,710	4,514
	Washington	4,272	9,267
	Total	161,149	224,890
Denmark	Porto Rico	18,093	26,616
France	New York	1,203	2,538
Germany	New Orleans	894	930
Norway	Maine and New Hampshire	3,026	4,786
	New Orleans	7,078	11,134
	Hawaii	5,969	9,200
	Total	16,073	25,120
United Kingdom	New Orleans	274	732
	Grand Total	197,686	280,826

EXPORTS OF HYDRAULIC CEMENT BY COUNTRIES, IN APRIL, 1925

Exports to—	Barrels	Value
Canada	1,850	$9,437
Cuba	26,431	63,979
Other West Indies	6,230	16,588
Mexico	13,637	39,188
Central America	11,708	31,201
South America	25,794	81,554
Other Countries	3,858	21,884
	89,508	263,831

(*a*)Compiled from records of the Bureau of Foreign and Domestic Commerce and subject to revision. (*b*)Imports and exports in May, 1925, not available.

The Central Provinces Portland Cement Co., of Jukehi, India, recently imported some Baldwin locomotives for use at its cement plant. These locomotives, after arriving by steamer from Philadelphia to Calcutta, were assembled at that point, loaded on a 40-ton railway wagon and hauled 65 miles to Jukehi.

No loading cranes being available, farmers furnished the man-power. Seven days were required to construct the necessary jacking arrangement and unload each locomotive from its truck.

Lewis J. Bennett, Buffalo philanthropist and capitalist, died recently at his home, Buffalo, N. Y. He organized the Buffalo Cement Co., one of the pioneer cement manufacturing concerns in the United States, in 1877.

Production of Hydraulic Lime

Each year considerable quantities of hydraulic lime are imported into the United States. It is therefore obvious that if this material could be produced economically from domestic resources, which are available, it would result in a saving to the users and would open for development an industry which is not active at present. After the Bureau of Standards had studied the literature on the subject it appeared entirely possible to produce such a material from the quality of limestone which is always present to a more or less extent in limestone workings but which is not suitable for the production of good lime. There was very little definite information at hand, however, on the exact composition of stone necessary or the time and temperature of burning. The determination of these conditions has been made the subject of an investigation and some very interesting results have been obtained.

Samples of limestone of the composition which seemed necessary for the production of hydraulic lime were obtained from several manufacturers of lime. Results obtained by other investigators, indicated that a burning temperature in excess of 1350° C. (2462° F.) would be required. However, when the stones were burned at this temperature and the products of calcination were hydrated, no hydraulic properties were exhibited nor even setting properties in the air.

The temperature of burning was then lowered to 1200° C. (2192° F.), and a product resulted which would set in from four to six hours in the air but had the undesirable property of dusting when dry. Slight hydraulic properties only were exhibited by this material.

The burning temperature was still further reduced to 1120° C. (2048° F.) with a burning period of four hours, and a material was obtained which had some of the desired characteristics. It hydrated readily, and when made into a 1:3 mortar would set under water over night. Furthermore, the unexpected property of early strength when stored in air was exhibited, a set of from 4 to 6 hrs. as indicated by the Vicat needle being obtained, with a tensile strength of 20 lbs. per sq. in. at 7 days and 35 lbs. per sq. in. at 90 days.

Inasmuch as the burning had been done in a small furnace a sufficient quantity of material for a complete determination of all of its properties was not obtained. It is therefore proposed to continue the work on a larger scale. Additional samples of limestone have been requested, and as soon as these are received and analyzed it is hoped to obtain the necessary information for the production of a quick-setting, hydraulic lime on a commercial scale.

Canadian Lime Plants Sold

Included in the list of properties taken over by the Fraser Companies Ltd., from the Stetson-Cutler Co., are seven subsidiary companies of the Stetson-Cutler Co., located in Maine. Henceforth the Stetson-Cutler Co. will be operated as a unit of Fraser Companies, Ltd., with the officers of Fraser company in charge of all operations. This eliminates a payment of about $22,500 transfer fee that would be required by the New Brunswick government, if the Stetson-Cutler Co. holdings had been transferred outright to the Fraser Companies, Ltd., and operated under the latter title.

Under the direction of the Fraser interests, the Stetson-Cutler Co. lime plants are expected to produce more lime than for some years. The annexation of the Stetson-Cutler properties, gives the Fraser interests a powerful hold on the lime manufacturing industry in New Brunswick and Maine. The Stetson-Cutler Co. operated for many years lime plants at St. John, N. B., and also in northern New Brunswick. United States capital dominated this concern.

The lime industry has been singularly free from labor troubles, insofar as the eastern Canadian territory is concerned. This situation is in direct contrast with other industries in eastern Canada, such as the bituminous coal mining, steel manufacturing, lumbering, pulp and paper producing industries. The workers have been very moderate in their demands on the manufacturers.

Donald Fraser, of Plaster Rock, N. B., vice president of Fraser Companies, has been re-elected president of the New Brunswick Temperance Alliance, a prohibitionist body of laymen and clergymen. Mr. Fraser has been the head of this organization for many years, his hobby being the advocacy of prohibition. He has devoted much of his time gratuitously, and is one of the most strenuous workers in the alliance. Mr. Fraser has direct supervision over the Fraser lime plants along the Tobique river, with Plaster Rock as the operating base.

Supporters of a scheme for the development of a harbor and docks at St. Andrews or Letete in New Brunswick on the Bay of Fundy coast, have contended that such a harbor would cause the opening of lime areas along the coast between St. John and St. Stephen. It is argued that these areas will not be really developed until the finished product can be shipped from either St. Andrews or Letete. Advocates of a branch line of railroad extending 13 miles from Pennfield, a station on the New Brunswick Southern branch of the Canadian Pacific Ry., to Black's Harbor on the Bay of Fundy shore, declare such a line would open up lime areas about Black's Harbor. At present fair sized and large vessels are unable to dock at any of the Bay of Fundy ports except St. John and St. George, on the New Brunswick shore. Promoters of the Pennfield-Black's Harbor line are hoping the line will be started this year, providing subsidies will be granted by the federal and provincial governments. Delegates from the points affected have waited on the provincial government. As there is no railroad connection, shipments of lime from the Black's Harbor section can be made only by water. The lack of facilities, and deep water for good sized vessels have prevented the full development of the lime properties in that district.

Quarry Industry Forms Section National Safety Council

Members of the National Safety Council who are in the quarry industry have formed a special section which will issue a news letter for the edification of not only each other but which will also go to the various trade associations. It is the feeling of the organizers that there is a big field in the crushed stone, crushed slag, slate and quarrying of all kinds of stone for more intensive work to prevent accidents.

The newly elected officers are: E. E. Evans, of the Whitehouse Stone Co., Toledo, chairman; and Don C. Couder, of the France Stone Co., Toledo, secretary. They are arranging a program for two sessions to be held during the National Safety Congress which will be held at Cleveland this September and will cooperate with the Cement Section of the National Safety Council.

Meetings already have been held in Toledo, in May and April, when preliminary plans for the new section were discussed.

Those people in the quarry industry who now belong to the National Safety Council have found that the service received from that non-profit-making, cooperative institution has enabled them to reduce their accidents and save considerable money on workmen's compensation insurance rates.

British Cement Production

Large Increase Forecast

Up till now Great Britain has made comparatively a much smaller use of concrete than has the United States. For building—at any rate in house construction—bricks have been preferred, while the main advantages which the concrete road possesses have been slurred over.

However, it appears that this attitude toward concrete is to change, in fact, for housebuilding it is a matter of "Hobson's choice." Owing to a shortage of bricklayers and the most pressing need for many thousands of dwellings, brick-built houses must be reinforced in number by dwellings built more rapidly by less highly-skilled labor and the Government's housing experts recently pronounced in favor of concrete construction as the best solution of the difficulty. This, added to steadily-increasing number of roads which are being constructed of concrete, indicates that a good time is coming for the British cement industry.

The annual production of cement in Britain is now a little over 3,000,000 tons, but the factories have only been working to about four-fifths full capacity owing to the demand for this product not being large enough to absorb more. The industry foresees a big increase in the demand and steps are being taken to get ready for this when it comes. With this end in view the Associated Portland Cement Works, Ltd., has recently commenced the construction of a new factory which is by far the largest concern of the kind in Britain. Not only will the new factory be large but it is claimed that it will represent the last word in modern cement-making practice. The promoters have taken the opportunity of investigating methods in the United States and it is proposed to try to incorporate all the best features found there as well as the most notable ones in factories in the various cement-producing countries of Europe.

The new factory, on which constructional work will proceed day and night in order that it may be ready early next year, is situated at Bevans, near Northfleet, not far from the mouth of the River Thames. On this very spot a small factory has been in operation for many years but it has been demolished to make room for the large buildings and up-to-date plant of the new concern. The site chosen is several square miles in extent and contains abundant supplies of chalk and clay, which, it is estimated, will be sufficient to meet the requirements of the factory for the next forty years. This raw material will be quarried out by steam navvies, mixed on the spot and then pumped direct to the mills as slurry through large pipes. There are to be four rotary kilns, each 250 ft. long and of a capacity of 2,500 tons per week each. Thus the total capacity of the factory will be over 500,000 tons a year, or nearly one-sixth of the total possible production of all the existing works in the country today.

Being situated near the mouth of the river the factory will be excellently served as regards water transport. A reinforced concrete jetty, built on concrete piles and 600 ft. long, is to be constructed and this will allow vessels of a tonnage up to 3000 tons to load or discharge at any stage of the tide. The latest mechanical methods of handling coal inward and cement outward will be installed so that labor is reduced to an absolute minimum. The amount of coal which will be consumed when the works are running at full capacity will be 250,000 tons per annum.

Electricity will be the motive force for the whole plant and it is stated that the power required to run the new works will be approximately 30,000,000 units a year.

The works are also very favorably situated as regards rail transport as they adjoin one of the branches of the Southern Ry. The favorable position of this new enterprise as regards land and water transport, the fact that the main raw materials are to be found on the spot, the up-to-date plant and arrangement of the works, will, it is claimed, allow cement to be produced at a lower figure than anywhere else in Britain. Consequently, instead of the expected increase in the demand for cement being likely to send prices up, as it would under present conditions, it may cause their decrease instead, through the building of this new factory.

British Portland Cement Manufactures Limited

The report of the directors of the British Portland Cement Manufacturers, Ltd., for the year ending December 31, 1924, indicates a fair improvement in the demand for portland cecement during the year, resulting in increased sales in both the home and export markets. The average realized was somewhat less than in the previous year, but on the other hand, economies were affected in the manufacturing cost. The year's trading results yielded in a revenue of £479,458, as compared with £449,419 for the previous year, an increase of £30,039. The sum of £150,000 has been placed to general depreciation reserve and £5000 to barge depreciation account.

The directors recommended the payment of a final dividend of 5% less income tax on the ordinary shares, making 10% for the year.

During the year, the assets of one of the subsidiary companies of which the whole of the capital was held by the British Portland Cement Manufacturers, Ltd., have been absorbed.

A reorganization of the Board was effected since the date of the last annual meeting, resulting in the retirement of Brig. Gen. F. C. Stanley, Alfred Brooks, G. E. Brooks, G. E. W. Granage, H. LeMerchant and Anthony White. Percy Malcolm Stewart, who had been elected of the Board and George F. Earle, offered themselves for re-election. The newly appointed directors retired at the annual meeting and in accordance with the articles of the Association, offered themselves for election by the shareholders.

Quick Hardening Portland Cement

Some important tests are now being undertaken by Professor Dixon at the City and Guilds Engineering College, South Kensington, on a new quick-hardening portland cement which is being put on the market by the Cement Marketing Company, Ltd. Tests are being made on beams and cubes made with ordinary portland cement and the new quick-hardening portland cement, all the test pieces being composed of a 1:2:4 mixture made under exactly the same conditions, the only difference being in the cement. The beams are 16 ft. long by 10½ in. deep, by 6 in. wide, resting on knife-edge supports 6 in. from each end and the load applied at points 2 ft. 6 in. from the center in each direction. So far tests have been made at ages of approximately 2 days, 4 days, and 7 days, when the beams cracked under the following loads: Age 56 hours—portland cement 4,000 lbs., quick-hardening cement 14,000 lbs.; 100 hours—portland cement 7,000 lbs., quick-hardening cement 1,900 lbs.; 7 days—portland cement 9,260 lbs., quick-hardening cement 21,000 lbs. Crushing tests on 6-in. cubes gave the following results: Age 56 hours—portland cement 700 lbs. per sq. in., quick-hardening cement 2,450 lbs.; 100 hours—portland cement 1,200 lbs., quick-hardening cement 4,000 lbs.; 7 days—portland cement 1,250 lbs., quick-hardening cement 5,100 lbs. The quick-hardening cement is a true portland cement.—*Concrete and Constructional Engineering.*

Wrench vs. Hammer Bunkum

By W. F. Schaphorst

The writer was interested recently on reading the following in a prominent technical publication:

"Many workmen daily confuse the real purpose of a wrench with that of a hammer. Their guiding principle for the moment appears to be, 'A wrench in the hand is worth two hammers on the bench.' There is an old saying to the effect that every man uses his thumbnail as a screw-driver once, and that he uses his monkey-wrench as a hammer until the boss catches him."

That paragraph, I am inclined to say, is about 95% bunk, but the trouble is a great many readers are liable to take it seriously. I can name a foreman for a large company who used to be very strict about little things like that. Whenever a light and loose pipe spacer was a trifle out of line and a man would tap it gently with an S-wrench to put the spacer where it belonged the foreman would shout (if he caught the man at it) "Hey there, you! A wrench isn't a hammer!" As a result a vast amount of time was wasted changing from wrenches to hammers and back again. He would not allow a man to use a shovel for prying no matter how slight the force required because, as he said, "A shovel isn't a crow-bar." Yet, as a matter of fact, shovels are combination shovels and crow-bars in tie-tamping operations in railroad maintenance work and in nearly every other kind of work.

Some fussy draftsmen say, "Never use a scale as a straightedge because a scale isn't a straightedge." I have never been able to understand why.

I have used my thumbnail as a screw-driver once, and I have used it a thousand times. By this time I know pretty well how much my thumbnail can stand. I haven't much regard for the fellow who quits after trying a good thing once.

Take a person's mouth, for example: It is used for eating, tasting, talking, drinking, singing, osculating, holding pillow cases, chewing gum and tobacco, smoking, whistling, swallowing swords used in various ways by sleight-of-hand performers, preaching the gospel, blowing dust off the table, playing unmusical instruments, licking postage stamps, by Chinese laundrymen for sprinkling clothes, and babies use it for putting everything into, and no doubt the mouth is applied to many other things that do not come to mind right now. Might I ask if the mouth should be used for only one purpose? Ridiculum!

Cost Accounting Within Individual Industries

The Department of Manufacture of the Chamber of Commerce of the United States, announces the development of a new plan for the conduct of cost accounting activities within individual industries. E. W. McCullough, manager of the department, in making public the accomplishment, says:

"It is of importance that the members of any manufacturing industry develop cost accounting principles, which when applied by individual members of the industry will result in correct costs. Where there is an adequate knowledge of cost, competition is on a better informed basis, and all parties at interest—the manufacturer, his customers, and his employes gain.

"Heretofore activities within trade associations in connection with cost accounting have been carried on without a background of experience, and with no time tested plan available that will make success certain."

The plan is now ready, as set forth in three pamphlets prepared by the Department of Manufacture under the general title of "Uniform Cost Accounting in Trade Associations." No. 1 is under the title, "Organization of Activities," No. 2, "The Work of the Cost Committee," and No. 3, "Acceptance and Installation." All three divisions of the plan are now available.

Requests for copies of these pamphlets and information in regard to uniform cost accounting movements may be made to the Department of Manfuacture, Chamber of Commerce of the United States, Washington.

Electric Purification of Gas

An error which appeared on page 101 in the December, 1924, Cement Mill Section of CONCRETE has been brought to the attention of the editors by the Western Precipitation Co., Los Angeles, Calif., and the Lurgi Apparatebau-Gesellschaft, associates of the Western Precipitate Co., in Germany. The article in question was the summary or a series of extracts from two articles appearing in the *Tonindustrie-Zeitung* by Nitzsche and in *Zement* by Oppen.

As published, Fig. 2 is marked the Oski Method and Fig. 3 by inference could also be considered as the Oski plant. These two figures show Lurgi construction.

On page 102, the statement that Lodge was the first to apply alternating current, which was transformed to a high voltage and then made direct, is in error as Lodge's work was all conducted with direct current obtained from influence machines and Cottrell was the first to use alternating current. In fact this was Cottrell's first contribution to the art, making the commercial utilization of the fundamental principles possible. Up to that time no reliable or satisfactory source of power was available and it was not possible to develop the process commercially or to incorporate sound engineering practice until a positive and controllable source of power was made available. Cottrell solved this problem by using alternating current as the source of power, transforming it to high potential and rectifying this high potential alternating current for use in the precipitation apparatus.

Hermitage Plant Active

With a record of having manufactured 505,000 barrels of portland cement since April 1924, and having supplied some of the most outstanding building projects in Middle Tennessee and through eight southern states, the Hermitage Portland Cement Co. of Nashville ranks today as one of the biggest enterprises of its kind in the south.

Its growth and rise to importance during the few months of its existence has been a notable one. Today it is distributing its cement into Tennessee, Kentucky, North Carolina, Georgia, Alabama, Mississippi, Louisiana and Arkansas. To supply such a demand it will produce in 1925 a total of 650,000 barrels. Memphis, according to E. W. McGovern, sales manager of the Hermitage Portland Cement Co., is one of its best markets.

The larger part of the company's output during 1924 went into Tennessee state highways.

J. C. Vance of Chattanooga, is president of this company which has the following other officers: T. L. Herbert, Jr., and J. N. Stone vice presidents; R. T. Miller, secretary, treasurer and general manager; Fred Stugard, superintendent and E. W. McGovern, sales manager.

The company represents an investment of one and one-half million dollars, and has a payroll of $1000 a day. The plant occupies 2½ acres, located in North Nashville.

Activities of Cement Manufacturers Protective Association Upheld by Supreme Court

The United States Supreme Court reversed the judgment of the District Court for the Southern District of New York, on June 1, in the appeal of the Cement Manufacturers Protective Association, nineteen cement manufacturing companies and certain individuals named in the case, against the injunction granted by the lower court, and absolved the cement manufacturers of charges that the association's trade practices destroy competition. The specific job contract is recognized by the Court as legitimate in connection with future deliveries of cement.

Considerable burden has been carried by the cement companies involved in the protracted litigation and an invaluable service has been rendered to trade associations in general by the appeal.

The Department of Justice, at the direction of the Attorney General and upon request, will advise trade associations on the legality of their activities.

A review of the facts in the case together with excerpts from the Supreme Court's opinion delivered by Justice Stone appears in the Regular Section of this issue of CONCRETE.

International Cement Corp. Acquires Indiana Plant

At a meeting of the directors of the Indiana Portland Cement Co. held at Indianapolis June 15, announcement was made of the purchase of the properties of that company by the International Cement Corporation.

The Indiana Portland Cement Co. operates a modern cement plant located midway between Indianapolis and Terre Haute with an annual productive capacity of 1,500,000 barrels. The trade territory of this company will broaden International's field of activities without interfering with its other properties in the central west.

The management of the Indiana company will be vested in men who have been long associated with the International System, they are:

H. Struckmann, president; Chas. L. Hogan, vice president and manager; H. A. Ross, assistant manager. The new Board in addition to the foregoing men, includes F. R. Bissell, chairman, Galen L. Stone, Charles Hayden and Richard F. Hoyt.

Commenting on the sale, H. Struckmann, who now becomes president of the Indiana Portland Cement Co., said: "As a member of the International System, the Indiana Portland Cement Co. will operate under the same policies now followed by the other seven companies in the System. These policies are a development of over twenty years experience in cement manufacture and merchandising and are responsible in large measure for the size and strength of the International System today.

Organized in 1919 with a productive capacity of 2,800,000 barrels per annum, the International Cement Corporation has in less than six years become one of the largest cement manufacturing organizations in the world.

With the purchase of the Indiana Portland Cement Co., the International System will have a combined annual productive capacity of 10,000,000 barrels of cement. Cement mills of the System now serve over half the population of the United States, all of Cuba, and Argentine and Uruguay in South America.

The International Cement Corporation owns and controls the following eight independent cement companies: Kansas Portland Cement Co., Kansas City Mo.; Texas Portland Cement Co., Houston and Dallas, Texas; Knickerbocker Portland Cement Co., Inc., Albany, N. Y.; Virginia Portland Cement Co., Norfolk, Va.; Cuban Portland Cement Co.; Argentine Portland Cement Co.; Uruguay Portland Cement Co.; Indiana Portland Cement Co.

Stockholders of International Cement Corporation at their annual meeting on June 19, authorized the increase of the preferred stock from 50,000 shares to 150,000 shares of the par value of $100 per share and the increase of the authorized common stock from 400,000 to 600,000 shares, without par value. This will provide the shares to be issued for financing the proposed acquisitions including the Indiana Portland Cement Co. properties located near Indianapolis. It was announced that negotiations had not yet been completed for the other properties, but it was hoped that these would be completed by the first of July, and announcement would be made at that time.

If the additional properties now under consideration are purchased it is proposed to issue approximately 67,500 additional shares of preferred stock. In the meantime 100,000 additional shares of common stock authorized, are to be offered pro rata to common stockholders of record at the close of business June 23, 1925, on the basis of one new share for every four shares now outstanding, at the rate of $50 per share. Warrants covering rights are to be mailed as soon as possible after June 23, 1925.

Authority was also given to the Directors to reserve 20,000 shares of the common stock for sale to officers and employees of the corporation, at the discretion of the Board, at not less than $50 per share.

Atlas Stock Change Approved

The annual meeting of stockholders of the Atlas Portland Cement Co., held at Northampton, Pa., on Wednesday, May 6, unanimously approved by the vote of all stock represented at the meeting, the program for changes in the capitalization of the company outlined by President John R. Morron, in his notice of the meeting.

The stockholders approved changing the common stock of the company from shares of $100 par value into shares of no par value, and exchanging three of such new shares for each share of common stock now outstanding; reducing the authorized preferred stock from $3,000,000 to $2,000,000 by cancelling $500,000 par value of unissued or treasury preferred stock; changing the preferred stock of the company from shares of $100 par value into shares of $33⅓ par value, exchanging three shares of such preferred stock for each share of preferred stock now outstanding, and authorizing 100,000 additional shares of common stock of no par value. The total authorized capital stock of the company now consists of 75,000 shares of preferred stock of $33⅓ each par value and 1,000,000 shares of common stock without par value.

The present Board of Directors was chosen for the ensuing year.

Trunk Line Rates on Cement

The Interstate Commerce Commission has suspended operation until July 18 of schedules proposing to amend the intermediate points rule in connection with rates on cement between various trunk line points so that it would not be applicable where specific rates on the same commodity to the intermediate point are published in some other tariff. The schedules were filed to become effective March 20 as published in Supplement No. 44 to Agent E. B. Boyd's tariff I. C. C. No. A-1343. The Commission has ordered an investigation of the propriety of the proposal.

Men and Mills

Notes from the Field

Good progress is being made at the new Detroit plant of the Peerless Portland Cement Co. The raw grinding department was put in operation early in June, and the first kiln fired on June 20. The finish grinding department is rapidly nearing completion, and it was expected that the third kiln would be producing clinker early in July. It is planned to have the complete plant in operation at full capacity and construction work all done early in August.

Reports were received early in May by the Carolina Portland Cement Co., Miami, to the effect that the Swedish freighter, "Masilla," with 60,000 sacks of cement from Brevik, Sweden, had taken on coal at Bermuda for the last lap of the voyage to Miami. This shipment of cement from Sweden is reported to be the first of its kind received by the Carolina company, and will be followed by periodical shipments every 60 days, according to present plans.

A United States Supreme Court decision recently handed down invalidates a levy imposed by the State of Massachusetts on the Alpha Portland Cement Co. State excise taxes on foreign corporations engaged exclusively in conducting an interstate business were held unconstitutional by the Supreme Court.

F. P. Kneeshaw, general manager of the Kandos Cement Co., Sydney, New South Wales, Australia, recently called at the editorial office of CONCRETE. Mr. Kneeshaw is making a tour of the cement districts of the United States and Canada, visiting cement plants. Before coming to the United States, Mr. Kneeshaw visited cement plants in England, Scotland, Switzerland, and other European countries. He was very much impressed with the cleanliness and lack of dust in the plants in Switzerland.

The Macdonald Engineering Co. recently started two new contracts for cement companies in the West.

For the Calaveras Cement Co., at San Andreas, Calif., the work consists of all of the concrete foundation work, together with eight slurry storage tanks, four cement storage tanks, 32 ft. inside diameter by 80 ft. high, and a packing house alongside for packing and shipping out packed cement. This will house two 3-tube Bates packers. The machinery for this plant is being furnished and designed by Allis-Chalmers Manufacturing Co. This is a new plant, and is near Valley Springs, Calif. Railroad connections are contemplated between this point and San Andreas.

The Macdonald company is also working on a new contract for storage silos for finished cement for the Old Mission Portland Cement Co., San Juan, Calif. This storage proposition consists of eight bins, 21 ft. in diameter by 69 ft. high. The packing house will consist of concrete foundations with a structural steel superstructure.

May was the banner month for the Acme Cement Co., Catskill, N. Y., which shipped 120,000 bbls. of cement in bags, requiring 480,000 containers. The company plans extensive improvements, which will greatly increase facilities for increasing its output.

Storage capacity of the Galloway plant of the Ash Grove Lime & Portland Cement Co. is being increased from 11,000 bbls. to 17,000 bbls. The increased capacity is handled by means of two large concrete tanks of 3000 bbls. capacity each, which are being constructed and will be ready for use about August 1.

The Phoenix Portland Cement Co. has completed a new kiln at its plant, located at North Birmingham, Ala., thus increasing the annual capacity to 2,000,000 bbls.

Lindley C. Morton, president of the company, announced that this increase in the capacity of the plant was made necessary by the growing demand for cement in that section. Since the building of this big plant, President Morton has established his home at Birmingham, Ala., and directs the operation of the plant from Birmingham.

With a large storage capacity, the operation of this plant is made possible all the year.

Richard K. Meade & Co., chemical and industrial engineers, have moved their offices from 11 East Fayette St., Baltimore, Md., to the Long Bldg., 10 West Chase St., Baltimore, Md.

The Bland Engineering Co., of Minneapolis, was awarded a contract to construct eight bins at the Universal Portland Cement Co.'s Duluth plant at a cost of $38,000, Ray S. Huey, superintendent, has announced. The bins will be circular in shape, 20 ft. in diameter, and 50 ft. high. They will each hold 10,000 bbls. of raw cement material.

Work of installing the two new dust collectors and a 300-ft. chimney at the plant will start soon after iron for the construction work arrives, at a cost of approximately $250,000.

Good progress has been made by the Macdonald Engineering Co. in construction of the cement storage silos at Bessemer, Pa., for the Bessemer Limestone & Cement Co. These bins are believed to be the largest cement storage silos in the world. They consist of four bins of 50 ft. inside diameter and are 80 ft. high above the foundation. They have side pocket bins, making the total capacity of the storage approximately 175,000 bbls. of cement.

The raw grinding department and the kilns of the new plant of the Clinchfield Portland Cement Co., near Perry, Georgia, were in operation on June 20, according to advices from that place. The company is building an 8-mile railroad from the plant to a point on the Georgia, Southern & Florida R. R., over which the products of the plant will be shipped. The daily output is given as 2500 bbls of cement.

A new turbine-generator unit, which is being installed at the Cape Girardeau, Mo., plant of the Marquette Cement Manufacturing Co., will be put into operation in July. This is the second of two units which will furnish power to operate the entire plant, the combined capacity being 200,000 kw.

Summarizing the operations of all Government-controlled corporations in the Philippine Islands in 1923, Governor General Wood in a report to the Philippine Legislature, points out the actual condition of Government investments in business; the benefits obtained as well as losses suffered, and the measures adopted or believed necessary for the protection of such investments. Among the corporations referred to is the Cebu Portland Cement Co. The Cebu Portland Cement Co. lost $47,500 in its operations last year and had its indebtedness to the Government increased by $320,000, but rendered much benefit in producing high-grade cement and in lowering the price of that commodity in the local market, the report says.

Continuing, the report declares: "In order to get the benefits of this high-grade cement manufactured in the Philippines and at the same time not have the Government be responsible for the company's operation, the plant should be disposed of as soon as practicable."

Receivers for the Tidewater Portland Cement Co., Union Bridge, Md., were appointed in Baltimore in the U. S. District Court. W. J. O'Brien and Jesse N. Bowen were named as receivers. The company consented to the receivership because suits brought against it for large amounts had made it impossible to continue business.

Reports from Union Bridge are to the effect that 1924 was the best year in the history of the Tidewater plant, so far as production and shipments were concerned. For the year 1925, up to the early part of June, the plant was considerably ahead of figures for a corresponding date in 1924.

Hugh F. VanDeventer, through whose efforts the Southern States Portland Cement Co. was organized and established, died on May 24, at Richmond, Va. This plant was the first large plant in the South, and Mr. VanDeventer retained his connection with it to the time of his death. Mr. VanDeventer was a graduate of the University of Michigan in mining engineering, and later took post graduate work at Harvard in metallurgy.

Carl Wesser, radiotrician at the plant of the Huron Portland Cement Co., at Alpena, Mich., was stricken suddenly ill with pleurisy recently, and pneumonia, which developed, greatly aggravated his illness.

Elbert Curtiss Fisher, president and general manager of the Wickes Boiler Co., Saginaw, Mich., died on May 18, last.

One of the colored employes of the Tidewater Portland Cement Co., at Union Bridge, Maryland, was recently found dead in the coal mill, his body having become entangled in the gearing of one of the machines. The point where the accident occurred is considered dangerous, and in that department a rule had been established that no oiling should be done except while the machinery was not in operation.

Reports from Portland, Oregon, indicate that the movement of cement from European countries will continue strong for several months. The French line steamer, "Nevada," discharged 56,000 sacks at Portland in May, and other consignments were looked for to arrive regularly.

To avoid possible accidents during the busy season, the Nebraska Cement Co., Superior, Nebr., has posted signs against visitors being admitted to certain parts of the plant, where danger of being caught in the machinery is imminent. Twenty-two freight cars were loaded at the plant recently with Superior and Ideal portland cement.

Clarence W. Heydt, engineer on a steam shovel was almost instantly killed recently when he was struck by a heavy steel bucket at a plant in the Lehigh Valley.

Although Oregon was the first state on the Pacific coast to manufacture portland cement, the industry passed out of existence in that state from 1890 until the establishment of the plant at Oswego in 1916. Since then, two other plants have been built at Gold Hill and Lime. These three mills are thoroughly modern and representative of the plants scattered throughout the United States.

It is reported that the Missouri Portland Cement Co., Post-Dispatch Bldg., St. Louis, Mo., will erect a $20,000 cement shed at Natural Bridge, one-story, 152 ft. x 32 ft., with a cement tile roof.

J. E. Zahn of the United States Portland Cement Co., Denver, called the attention of the Manufacturers' Bureau of the Denver Chamber of Commerce to the need for keeping an eye on the Colorado legislature as regards compensation insurance, and a special committee was appointed.

Three laborers employed by the Cowell Portland Cement Co., were killed recently near Concord, Calif., when a quantity of blasting powder exploded. The accident is said to have resulted from workmen using shovels instead of their hands, as instructed, in placing the powder in position.

A charter for the Mid-Continental Portland Cement Co. was filed recently at Dover, Del. The company is capitalized at $11,000,000. Chalres E. Bishop, E. H. Fuestel and A. H. Bishop of Wilmington, Del., are named in the document.

A reduction of 1 cent per 100 pounds in cement rates from Kansas City and Sugar Creek, Mo., to St. Joseph and related points has been held to be unreasonable by the Interstate Commerce Commission and the railroads that proposed the new schedule were ordered to suspend them and to maintain present rates.

An outstanding feature with regard to the lime and shale deposits which the American Portland Cement Co., plans to use as raw material for manufacturing a high grade portland cement, is the fact that the deposits can be handled with steam shovels and will require little or no preparation for the grinders. It is claimed by the officials of the company that it will not be necessary to do any blasting as is ordinarily done at limestone deposits in cement quarries, and that primary and secondary crushing as well as expensive transportation of the raw materials will be eliminated. It is estimated by engineers that the company has a deposit of at least 15,000,000 tons of hard shell lime on top of the ground on the 1140 acres of land controlled by the company. Immediately adjacent to this is an inexhaustible supply of clay, known as modeling clay.

The company is organized under the laws of California, the capital stock amounting to $3,000,000, all common stock. According to advice from W. L. Peck, president and general manager, no promotion stock will participate in the profits of the company until the treasury stock, which is being sold at the present time receives 50% return.

It is planned to locate the mill near the land which is at Cowduwells, Imperial Co., Calif. The tract is 1½ miles from transportation in a locality where it is believed by the officials of the company, there will be sufficient territory to dispose of the entire output of the plant without troublesome competition. It is the purpose of the company to build a plant that will produce about 1000 bbls. of cement per day, laid out in such a manner that two additional units of 1000 bbls. a day, each, can be added at any time the demand may require. The estimated cost of the first unit will be approximately $750,000.

The following is a list of officers of the company: W. L. Peck, president and general manager; William H. Hopper, vice president; O. T. Deal, secretary and treasurer.

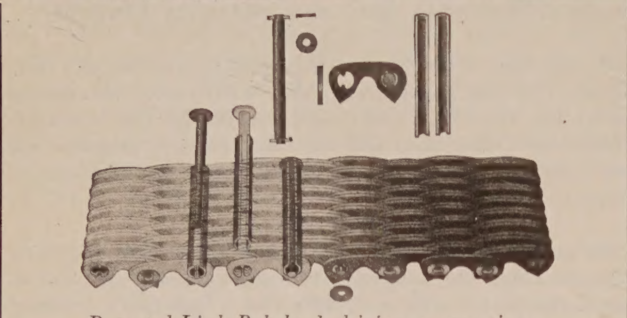
William E. Erdell, Allentown, Pa., president of the Penn-Allen Cement Co., has purchased from Sylvester Helfrich the famous Helfrich's Spring property. It includes the noted spring on the road to Catasauqua, Mickley's and Egypt and a farm of almost 150 acres.

Motive power at the West Coplay mill of the Lehigh Portland Cement Co. is being changed to electricity. High tension wires are being sent to the mill and a building has been erected to house the transformers and other electrical equipment. The power will be furnished by the Pennsylvania Power and Light Co. Electric power will also be installed in the Ormrod mill after the West Coplay mill has been electrified.

The two New York City offices of the Cutler-Hammer Co., one of which was located at 50 Church St., and the other in the Times Bldg., have been consolidated and are now located at 8 West 40th St.

Silent Chain Drives From Stock

Link-Belt Co. of Indianapolis, Chicago and Philadelphia has placed in operation a new plan by which complete lines of silent chain drives of from ¼ to 10 h. p., in practically any reduction from 1:1 to 7:1, are now available for immediate delivery, by distributors located in many principal cities of this country.



Patented Link-Belt bushed joint construction.

The installation of silent chain drives remains somewhat of an engineering problem, but one which has been simplified in conveniently arranged tables, which have been published in book form for distribution by the Link-Belt Co.

The patented bushed joint construction shown in the illustration is the same in the standard stock drive chains as it is in the standard Link-Belt silent chain used for the past 20 years for industrial drives.

New Speed Transformer

An improved ball-bearing speed transformer has been announced by the Albaugh-Dover Mfg. Co., Chicago, Ill. One of the outstanding features claimed for this equipment is that it has full ball bearings throughout. It is claimed by the manufacturers that this equipment is built on the true planetary principle, all external gears with transmission shafts symmetrically located around the drive and driven shaft equalizing the transmission pressure into uniform balance on shafts supported at each end in ball bearings. It can be used either as a speed amplifier or speed reducer, according to the conditions under which it is applied.

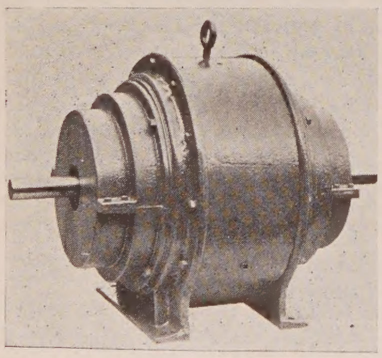


Fig. 1—The Albaugh-Dover speed transformer

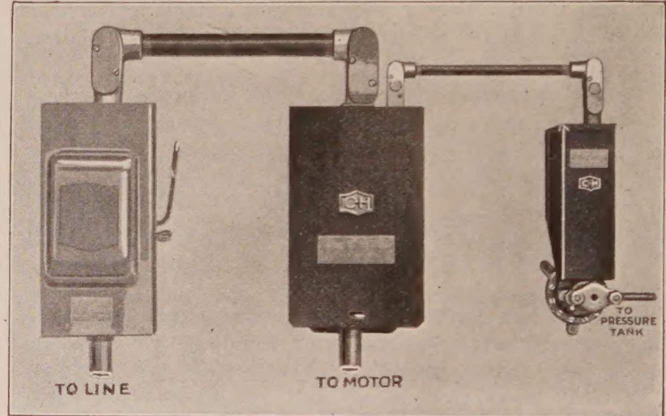
New Roller Hanger Bearing

The Dodge Manufacturing Corp., Mishawaka, Ind., has placed on the market a new lineshaft bearing embodying the Timken tapered roller bearing, as well as several new features of construction. The introduction of this product is the result of many years development and investigation.

The Dodge-Timken roller hanger bearing is a simple bearing. There are only five parts to the complete assembly. It consists of two Timken tapered roller bearings mounted on a ground and slotted steel tube and fitted to an accurately machined housing. The ends of the steel tube are threaded to receive clamping collars designed to secure accurate adjustment of the bearings on the tube. This adjustment is made at the factory and need not be altered by the user.

Simple Automatic Pressure Tank Control

The accompanying illustration shows a typical safe wiring and installation arrangement for the automatic control of a small A. C. single phase motor-driven pump outfit. The main line switch is of the enclosed outside-operated type mounted alongside of the Cutler-Hammer double pole magnetic switch and pressure-actuated switch. The latter is connected by pipe to the tank and electrically to the magnetic coil of the magnetic switch so that when the pressure in the tank drops to a predetermined low value the magnetic switch is caused to close, this automatically connecting the motor on the line. When the pressure reaches the desired high value, the pressure switch opens, the magnetic switches drop out, and the motor and pump come to rest.



Arrangement for automatic control of an A. C. single-phase motor-driven pump outfit

Nuttall Helical Gear Speed Reducer

The Nutall helical gear speed reducer which will shortly be introduced by the R. D. Nuttall Company of Pittsburgh is a new type of gear and pinion speed reducer with three jack shafts spaced 120° apart in a cast iron case, surrounding and meshing with the inlet and outlet shafts. The gearing carries its load at three balanced points and the high and low speed shaft center lines are axially coincident.

Gears are of forged high carbon steel, specially heat treated. All gear teeth are then finish cut after heat treatment to insure accuracy.

The case is made approximately cylindrical with an inner center web, supporting the inner bearings for high and low speed shafts. Anti-friction type bearings are used, Timken tapered roller bearings being standard. The lubrication system is a combination of trough, splash and reservoir systems and is entirely automatic.

It is claimed by the manufacturers that the use of these speed reducers permits the use of low-cost, highspeed motors, small floor space and maximum efficiency of power transmission while the maintenance cost is low.

The double reduction is similar to the single reduction except it is used for ratios greater than 16:1.

This equipment is recommended by the manufacturers for use in cement, sand, brick, clay, mining, machine, metal, foundry, and other industries for such purposes as driving or running elevators, conveyors, hoists, car pullers, car loaders, fans, blowers, compressors, mechanical stokers, pumps, agitators, mixers, dryers, etc.

It may be used with electric motors, gas engines, steam engines and turbines, marine motors, oil engines, line shaft drives, pulley and belt drives, etc.

DeLaval Worm Gear Reducer

The De Laval Steam Turbine Co., of Trenton, N. J., has developed a line of worm gear reductions which are applicable to motors and turbines driving such machinery as rotary kilns and coolers, tumbling barrels, agitators, mixers, dryers, mills, calendars, paper machinery, machine tools, stokers, cooling tables, transfer rolls, door lifts, fans, elevators and conveyors of all types.

The design of this gearing has been based upon a careful study of the underlying engineering principles, and the gearing is produced by special equipment. It differs from the ordinary worm gearing in the tooth shape used, in the materials employed, in the treatment of the materials, and in the manufacturing methods and shop control. The tooth shape is such as to combine a minimum of sliding and a maximum of rolling action between the worm and the gear, and at the same time to realize continuously the greatest area of contact.

New Crawling Tractor Crane

Crawling tractor cranes have been developed to extend the usefulness of the locomotive crane beyond the limitation of rails and several manufacturers of material-handling equipment have entered this field. The Industrial Works, Bay City, Mich., has just recently announced the improved 10-ton crawling tractor crane in the accompanying illustration. This crane is known as type DC and its design embodies a number of new engineering features outlined by the manufacturers including split gears for propelling, increased speed, double clutch mechanism, unusually long tractor belts, independent functions, etc.

New industrial type DC crawling tractor crane

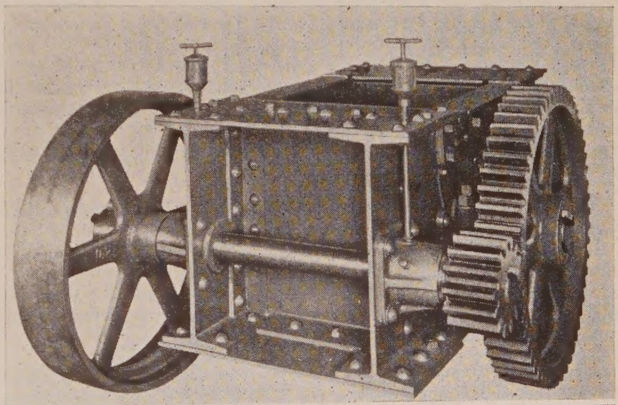
Most important of all the new features, according to the manufacturers, is the system of split gears by which each tractor belt is separately controlled. It is claimed that the Industrial type DC is the only crawler crane which steers and propels by friction clutches and that it has features which make maneuvering in close quarters comparatively simple.

The crane can be equipped to operate with a steam engine, electric motor, gasoline motor or fuel oil engine of the Diesel type to suit any operating conditions known today. This equipment is recommended by the makers to meet a demand for a general utility crane of small capacity sturdily built for use in practically all fields of industry.

New Pennsylvania Crusher

A new type of crusher has been announced by the Pennsylvania Crusher Co., Philadelphia, Pa., as the new Pennsylvania Armorframe single roll coal crusher. This equipment, typical views of which are shown in the accompanying illustrations was designed as the result of the constantly increasing popularity of the single roll type of crusher for stoker coal preparation, crushing coal for pulverizers, gas plant use, and other purposes.

In operation, coal is fed to the crusher in any quantity desired. The rotating toothed roll draws the coal into the tapered opening between the roll and breaker plate, reducing it to the desired size and discharging it below to belt, elevator or direct to the bunkers. The operation of the crusher is illustrated in the cross section illustration which also shows the spring relief in case of iron in the feed. The natural action of the teeth passing through the coal on top of the roll produces a shaking action which carries the finer pieces of coal in the feed through the crushing zone with a minimum of crushing. This, it is claimed, accounts partly for the low percentage of fines produced in this type of crusher. The size and adjustment of the spring suspension to prevent the yielding of the springs for any except uncrushable materials, accounts for the minimum of oversize.



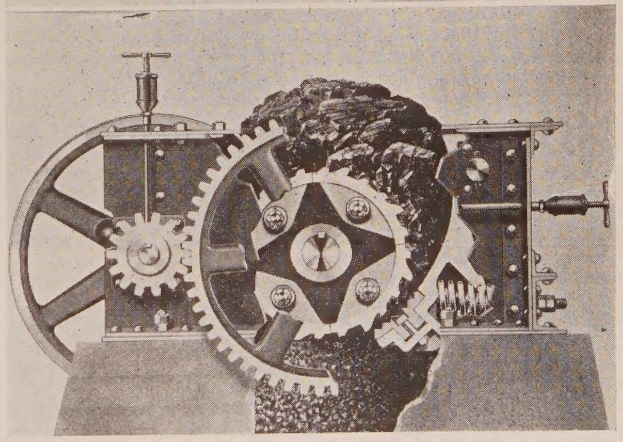


Fig. 1—Exterior of Pennsylvania Steel-built Armorframe crusher

Fig. 2—Cross sectional view of Pennsylvania crusher showing device for varying fineness of crushing, patented segment roll and reversible breaker plate strip

The side frames are constructed of Bethlehem Section 30-in. I-beam girders with cross members of heavy channel and angle plate, hot riveted to the girder beam side frame to form the rigid unbreakable unit construction. A segmental roll of special patented construction is provided, with no bolts through the crushing surface. A pivoted breaker plate is readily adjustable to and from the crushing roll to vary the size of the product as needed.

Trade Publications

Synchronous Motors for Pumping, Bulletin No. 861, has just been issued by the Electric Machinery Mfg. Co., Minneapolis, Minn. This bulletin is 8½ x 11 in. and contains 16 pages fully illustrated. It describes the self-starting synchronous motors, standardized in all sizes from the largest down to 20 h. p.

Among the subjects covered are applications of synchronous motor driven pumps for municipal water works, deep well pumping, irrigation pumping, drainage pumping, dry dock pumping, sewage pumping, mine pumping and suction dredging as well as in connection with industrial plants.

Bulletin No. 44 issued by the Aeroil Burner Co., Inc., Union Hill, N. J., is a 6-page folder describing oil burning smokeless tar, pitch and asphalt kettles for roofing, waterproofing, insulating, flooring and paving work. Points of advantage claimed for the aeroil equipment include: all welded seams, easy to clean, rugged construction, oil fired, inside kettle lifts out, low fuel cost, absolute temperature control, very compact and easy to handle.

A wheel kettle with burner arrangement is illustrated as ideal for street paving and road work. It is particularly suited for filling cracks and joints in concrete pavement and is being used successfully by the New York State Highway Department.

When Science Goes to Work for Modern Industry, published by the Portland Cement Association, is a 12-page booklet describing the activities of the Structural Materials Research Laboratory, Lewis Institute, Chicago. The booklet is illustrated with very interesting pictures showing some of the work which is done in the laboratory as well as work done in the field in cooperation with Professor Duff A. Abrams and his assistants.

De LaVergne Oil Engines, Horizontal Type S-1 is the title of an 8½ x 11-in. catalog just issued by the De LaVergne Machine Co., New York City, which describes and illustrates the De LaVergne Diesel oil engine without an air compressor, which is claimed by the manufacturers to be the greatest step in advance since the invention of the high compression oil engine. The De LaVergne modification of the Diesel engine has increased the field of application of the oil engine, claimed to be the most economical and reliable of all the prime movers.

Pressure Type Water Filters is the subject of Bulletin 501 issued by Graver Corporation, East Chicago, Indiana.

The bulletin, consisting of 8 pages, 8½ in. x 11 in., describes filtration methods and shows the construction of the Graver filters which are furnished with a perforated strainer plate instead of a pipe manifold and strainer heads for the collection of the filtered water.

Complete tables of sizes and capacities are given.

The Pennsylvania Pump & Compressor Co., Easton, Pa., has issued an illustrated 16-page bulletin, No. 206 presenting its line of double suction, single stage, centrifugal pumps; a 12-page bulletin, No. 118, describing and illustrating the air-lift method of pumping water by compressed air, and bulletin No. 205 describing a close coupled centrifugal pump suitable for brine or water service, and 1 and 1¼-in. sizes and for capacities from 10 to 45 gallons per minute.

The Sullivan Machinery Co. has recently published several new bulletins on Diamond drills and Hammer drills as follows: Bulletin 80-A, describing the Sullivan "C" and "CN" mounted diamond core drills with gas engine drive, designed for use in rough country and where fuel and water are scarce; Bulletin 81-G, describing in detail the new model "DU-48" rotating water stopers, which are now being offered to the mining public as the most satisfactory form of upper hole drill yet devised; Bulletin 81-F, a new edition of the Sullivan catalog on rotator hammer drills, which are made in seven styles including an auger drill for soft and broken ground; and Bulletin 81-E, a new edition of the Sullivan bulletin on its popular water jet mounted hammer drills, capable of performing the heaviest kind of rock drilling.

A supplementary bulletin 81-EA, describes special fixtures for adapting the DW-64 drill, to be used on quarry bars by contractors and stone men in line drilling or channeling.

The Hill Clutch Machine & Foundry Co., Cleveland, Ohio, has just issued *Bulletin No. 112*, calling attention to and illustrating the patented Cleveland type Hill collar oiling bearing, which is the company's latest design and a development and improvement of the older standard type.

Schramm Air Compressors, C-25-A, is the title of a 7½ x 10½ in., 31-page paper covered catalog recently put out by Schramm, Inc., West Chester, Pa., which describes and profusely illustrates the complete line of Schramm compressor equipment.

A management leaflet entitled *Analysis of Branch Managers' Contracts* has been issued by the Metropolitan Life Insurance Co., New York City. The booklet is the second of a new series of Bureau publications dealing with methods of compensation. It has been prepared by the Policyholders' Service Bureau, Business Management Section, Group Insurance Division.

The information contained is based on the existing contracts of numerous representative companies and is the kind of information not otherwise available in such compact form.

Hardinge Air Classifiers, Bulletin No. 17, issued by the Hardinge Co., York, Pa., describes the rotary air classifier and combined rotary and superfine classifier for use with Hardinge conical mill. This bulletin is 8¼ in. x 10½ in. containing 8 pages with illustrations. The Hardinge air classifier described has been developed, according to the manufacturer, to meet the general demand for fine dry grinding and to eliminate auxiliary apparatus heretofore required when a fine dry product has been desired.

The Hardinge rotary air classifier can be attached to any Hardinge mill now operating, providing a clear space is available in front of the discharge. It is capable of producing a product of approximately 98%, passing 48 mesh and 80% passing 200 mesh or coarser if desired, when grinding such materials as limestone, feldspar, silica and coal. If a finer product is required, the combination of the Hardinge rotary and superfine classifier, also described in the bulletin, is recommended. The rotary and superfine classifier is an amplification of the Hardinge rotary classifier and is capable of meeting the most severe specification in regard to fineness. The double classification feature is recommended as making it possible to deliver a uniform product. Adjustments may be made so that any desired product can be obtained from approximately 75% through 200 mesh up to 98% through 325 mesh.

The Insulation of Boilers is the title of Bulletin B-6E issued by the Celite Products Co., of interest to those in industrial plants or institutions which use power, process steam or heat.

This bulletin is changed somewhat from previous issues, additional information being included on the insulation of powered fuel furnaces and the insulation of stacks. The illustrations show method of insulation of boilers and breeching.

The Poole Engineering and Machine Co., Baltimore, Md., has just issued a bulletin entitled *Do You Know How Poole Gears Are Made?* This bulletin describes and illustrates the Poole method of making machine molded gears and describes in detail how the high degree of accuracy is obtained.

The American Manganese Steel Co. has just issued a circular containing a list of some of the successful applications for manganese steel castings. It names practically all of the applications of manganese steel as so far developed, and a tabloid exposition of the character and peculiarities of magnanese steel is outlined on the last page of the bulletin.

Better Foundry Sands is the title of Bulletin No. 35 issued by the Pittsburgh Testing Laboratory Inspecting Engineers and Chemists, Pittsburgh, Pa. In this bulletin are outlined some of the tests commonly made by both molding and core sand. Standard apparatus for testing foundry sands has been installed in the Pittsburgh laboratory in accordance with recommendations by the American Foundrymen's Association.

Under the heading *Osgood Facts and Pictures*, the Osgood Co., Marion, Ohio, has issued bulletin 250, describing and illustrating the various parts and features of the Osgood revolving shovel. This bulletin which contains 16 pages, size 8½ in. x 11 in., includes a table of ordinary working ranges of Osgood ¾-, 1-, 1¼-yd. revolving shovels, clamshells, draglines and cranes.

The Worthington Pump and Machinery Corp., New York City, has just issued Bulletin S-171, 11 pages and cover, describing and illustrating its new double acting two-cycle engine, which is recommended by the manufacturers as suitable for industrial service in units ranging from 1000 to 5000 h. p.

Handle Ashes Economically. A folder issued by the Conveyors Corporation of America, 326 W. Madison, St., Chicago, Ill., describes the company's system of ash disposal for which the following advantages are claimed: labor saving, low steam consumption, dustless ash removal.

Steam is consumed only while the conveyor is in actual operation, according to the manufacturers, and figured on a basis of cost per ton handled, the amount is low.

Jones Power Transmitting Machinery, general catalog, No. 30, just issued by the W. A. Jones Foundry & Machine Co., Chicago, Ill., contains 448 pages of power transmission machinery data, including cut gears, cast gears, spur gear speed reducers, enclosed worm gear drives, cast iron pulleys, friction clutches, sprocket wheels, hanger boxes, pillow blocks, couplings, rope sheaves, etc. This is a complete catalog, attractively illustrated, of convenient size, 5½ x 8 in. with cloth binding, and contains much valuable information.

Refractories and Furnace Design is the title of a new edition of the Plibrico catalog issued by the Plibrico Jointless Firebrick, Co., Chicago, Ill. This catalog is 8½ in. x 11 in.; 36 pages, illustrated.

A large section is devoted to the proper installation of monolithic furnace lining. It tells step by step, how monolithic lining should be installed. The use of Plibrico lining for furnace fronts, arches, side walls, and bridge walls in boiler furnaces and for heating furnaces, baking ovens, stills and other industrial furnaces and miscellaneous applications of Plibrico is described.